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A Contribution to the Fauna of Fruit Flies (Diptera, Tephritidae) in Fars Province, Southern Iran

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Abstract: The tephritid fauna (Diptera: Tephritidae) was studied in different places of Fars province (South Iran) during year 2013. A total of 15 species representing 13 genera belonging to five tribes and two subfamilies were collected and recognized. The genus *Schistopterus* BECKER, 1903 and two species viz., *S. moebiusi* BECKER, 1903 and *Capitites ramulosa* (LOEW, 1844) are recorded from Iran for the first time. In addition, available information for each species and notes on host plant(s) and geographical distribution are given.

Key words: Diptera, distribution, fauna, host plants, Iran, new records, Tephritidae.

Introduction

The Tephritidae is a diverse, cosmopolitan family of flies commonly known as fruit flies. Approximately 4400 described species are distributed worldwide (NORRBOM 2004, NORRBOM & CONDON 2010). The larvae are phytophagous and can be serious pests of agricultural crops. Some species, such as *Ceratitis capitata* (WIEDEMANN, 1824), *Rhagoletis pomonella* (WALSH, 1867), *Bactrocera dorsalis* (HENDEL, 1912), *B. oleae* (GMELIN, 1790), *B. tryoni* (FROGGATT, 1897) and *Anastrepha ludens* (LOEW, 1873), cause damage of several billion US dollars per year (MERZ et al. 2006). However, some of species are known as biological control agents of noxious weeds, especially of various species of Asteraceae (FREIDBERG & KUGLER 1989).

In recent years, some contributions have been done for collecting, identifying the Iranian tephritids and their hosts (e.g. PARCHAMI ARAGHI 1995, GHARALI et al. 2004, 2006, GILASIAN 2007, GILASIAN & MERZ 2008, MOHAMADZADE NAMIN et al. 2010a,b,c, ZARGHANI et al. 2010a,b,c, GHARAJEDAGHI et al. 2011a,b,c, KARIMPOUR 2011, KORNEYEV et al. 2011, MOHAMADZADE NAMIN 2011a,b, MOHAMADZADE NAMIN et al. 2011, MOHAMADZADE NAMIN & NOZARI 2011a,b, FAZEL et al. 2011, GHARAJEDAGHI et al. 2012, KORNEYEV 2013).

Fars province (coordinates 27°-31°N, 50°-55°E) is located in the southern part of the Iran. Fars consists of three completely different regions. (1) The mountain area north and northwest, with moderate cold winters and mild summers, (2) the central region, with relatively rainy mild winters, and hot dry summers, (3) the south and southeast, with moderate winters and very hot summers. Fars with having such climate and geographic diversity is a very interesting area, offers ideal conditions for biodiversity.

The aim of the present study was to provide detailed information on the distribution of tephritid flies species and their hosts in Fars province, and to make an additional contribution to the knowledge of the Iranian fruit flies fauna.

Materials and methods

A portion of the specimens studied were captured by pan and Malaise traps. Also some specimens were collected by swept on flowers head of Asteraceae plants during year 2013. The voucher specimens are deposited in the Department of Entomology, College of Agriculture, Marvdasht Branch, Islamic Azad University, Marvdasht, Iran. The taxonomic arrangement used in this paper was adapted from WHITE & ELSON-HARRIS (1992) and NORRBOM (2004).

Results

In a total of 15 species belonging to the subfamilies Dacinae and Tephritinae were collected in Fars province. Of these, one genus and two species are reported for the first time for Iranian fauna. The subfamilies, tribes and species are listed in alphabetic order.

Subfamily D a c i n a e

Tribe C e r a t i d i n i

Genus *Ceratit* MACLEAY, 1829

Ceratit capitata (WIEDEMANN, 1824)

Material examined: 8 ♀♀: Fars, Farough, 29°15'N, 53°25'E, 04.x.2013, Malaise trap in Pomegranate garden.

Host records from Iran: Peach, Apricot, Plum, Garden Plum, Pear, Apple, Tomato, Cherry, Quince, Kaki, Grapevine, Pomegranate, Medlar, Fig, Grape, Banana, Tangerine, Mandarin, Citrus and many other fruit trees (DASTGHEYB BEHESHTI 1980, SABZEVARI & JAFARI 1991, BEHDAD 1991, PEZHMAN et al. 2011, MODARES AWAL 1994).

Hosts outside Iran: Larvae in peaches, pears and apples (Rosaceae). Over 250 plant types from more than 40 families (WHITE & ELSON-HARRIS 1992).

Distribution in Iran: Mazandran, Khorasan, Tehran, Gilan, Markazi, Semnan, Esfahan, Yazd, Kermanshah, Kordestan (DASTGHEYB BEHESHTI 1980, ESMAILI 1983, FISCHER-COLBRIE & BUSCH-PETERSEN 1989, SABZEVARI & JAFARI 1991, BEHDAD 1991, MODARES AWAL 1994, MOHAMADZADE NAMIN et al. 2010c, MIRSARDOO et al. 2010), Fars (FAZEL et al. 2011, PEZHMAN et al. 2011).

General distribution: Africa, Atlantic Ocean Islands, Indian ocean Islands, Australia, Pacific Ocean Islands, Europe, Middle East, Central America, South Africa, West Indies (WHITE & ELSON-HARRIS 1992), Tropical Africa, Madagascar,

Mauritius, Reunion, introduced North Africa, South Europe, Middle East, Neotropics, West Australia, Hawaii (NORRBOM et al. 1998), Originally an East African species, introduced with commerce to North Africa, Southern Europe, Near and Middle East, Neotropics, Australia and Hawaii, Yemen (MERZ et al. 2006).

Tribe **D a c i n i**

Genus **B a c t r o c e r a** MACQUART, 1835

Bactrocera zonata (SAUNDERS, 1842)

Material examined: 1 ♀: Fars, Larestan, 27°13'N, 54°25'E, 08.v.2013, Malaise trap.
This is a new record for the fauna of Fars province.

Host record from Iran: Mango (BAGHERI et al. 2010).

Hosts outside Iran: Euphorbiaceae, Lecythidaceae, Rhamnaceae, *Prunus persica* L. (Rosaceae), *Annona squamosa* L. (Annonaceae), *Psidium guajava* L. (Myrtaceae), *Mangifera indica* L. (Anacardiaceae), *Momordica charantia* L. (Cucurbitaceae), *Phoenix dactylifera* L. (Arecaceae), *Malus pumila* MILL. (Rosaceae), *Grewia asiatica* L. (Tiliaceae), *Punica granatum* L. (Punicaceae), *Cydonia oblonga* MILL. (Rosaceae), *Terminalia catappa* L. (Combretaceae), *Solanum melongena* L. (Solanaceae), *Aegle marmelos* L. (Rutaceae) (WHITE & ELSON-HARRIS 1992, ALLWOOD et al. 1999).

Distribution in Iran: HORMOZGAN, SISTAN & BALUCHESTAN (GILASIAN 2007, BAGHERI et al. 2010).

General distribution: Indian Ocean, North America, Tropical Asia (WHITE & ELSON-HARRIS 1992), Pakistan and Sri Lanka to Vietnam, Indonesia (Maluku), introduced Mauritius (NORRBOM et al. 1998), North Africa, Arabian Peninsula, Tropical Asia, United Arab Emirates (MERZ 2008).

Genus **D a c u s** FABRICIUS, 1805

Dacus ciliatus (LOEW, 1862)

Material examined: 35 ♀♀; 40 ♂♂: Fars, Farough, 29°15'N, 53°25'E, 16.ix.2013, Malaise trap in alfalfa field.

Host records from Iran: Cucurbitaceae (Melon, Cantaloupe, Cucumber, Watermelon, Gourd) (SIRJANI & KAMALI 1995, PARCHAMI ARAGHI 1995).

Hosts outside Iran: Asclepiadaceae, Cucurbitaceae, African subgenera have been reared from the fruit or flower buds of Passifloraceae, Apocynaceae and Periplocaceae (ALUJA & NORRBOM 1999), Many species of Cucurbitaceae, wild growing colocynth (WHITE & ELSON-HARRIS 1992), *Citrullus lanatus* THUNB., *Coccinia grandis* L., *Cucumis sativus* L., *Luffa aegyptiaca* MILL., *Momordica charantia* L. (Cucurbitaceae) (ALLWOOD et al. 1999).

Distribution in Iran: Fars, Hormozgan, Khuzestan, Khorasan Razavi, Tehran (PARCHAMI ARAGHI 1995, SIRJANI 1995, SIRJANI & KAMALI 1995, GILASIAN 2007), Kurdistan (MOHAMMADZADE NAMIN & NOZARI 2011a).

General distribution: Africa, Atlantic Islands, Middle East, Saudi

Arabia, Yemen People's Democratic Republic, Yemen Arab Republic, probably in Iran, Oriental (WHITE & ELSON-HARRIS 1992), Senegal East to Somalia, South Africa, Madagascar, introduced Mauritius, Reunion, Israel & Egypt East to Burma (NORRBOOM et al. 1998), An Afrotropical species which is also found in the Middle East and South Asia (MERZ et al. 2006).

Subfamily T e p h r i t i n a e

Tribe S c h i s t o p t e r i n i

Genus *Schistopterus* BECKER, 1903

Schistopterus moebiusi BECKER, 1903

Material examined: 1♀: Fars, Naghsh e Rustam, 29°59'N, 52°25'E, 16.ix.2013, Malaise trap in alfalfa field. **This is a new record and *Schistopterus* is a new genus for the fauna of Iran and Fars province.**

Host records from Iran: Unknown.

Hosts outside Iran: The larvae develop in flower heads of *Pluchea dioscoridis* (Asteraceae) (FREIDBERG & KUGLER 1989).

General distribution: Afrotropical Region, Near East, Arabian Peninsula, UAE (MERZ, 2008).

Tribe T e p h r i t i n i

Genus *Acanthiophilus* BECKER, 1908

Acanthiophilus helianthi (ROSSI, 1794)

Material examined: 5♀♀; 10♂♂: Fars, Marvdasht, 29°52'N, 52°48'E, 10.vi.2013, swept from flower heads of *Centaurea solstitialis* L.; 27♀♀; 49♂♂: Fars, Atabak, 29°46'N, 52°51'E, 01.vii.2013, Malaise trap in alfalfa field.

Host records from Iran: (Safflower) *Carthamus tinctorius* L. (MODARES AWAL 1994, HATAMI et al. 2008, KEYHANIAN 2008, SAEIDI & NUR AZURA 2011a,b, SAEIDI et al. 2011a,b,c,d, SAEIDI et al. 2012); *Carthamus oxyacanthus* M. BIEB., *Centaurea cyanus* L. (Asteraceae) (MOHMMADZADE NAMIN et al. 2010a); *Carthamus lanatus* L. (Asteraceae) (MOHMMADZADE NAMIN et al. 2010c); *Cnicus benedictus* L., *Serratula coriacea* FISCH. & MEY. ex DC., *Serratula coriacea*, *Centaurea behen* L., *Centaurea behen* (Asteraceae) (KARIMPOUR 2011); *Cosmos bipinnatus* CAV., *Centaurea amadanensis* SCH. BIP., *Centaurea nemecii* NBELEK, *Centaurea leuzeoides* JAUB. & SPACH., *Centaurea aucheri* DC., *Jurinea* sp. (Asteraceae) (MOHMMADZADE NAMIN & NOZARI 2011a).

Hosts outside Iran: The larvae develop in flower heads of various species of *Carthamus*, *Centaurea* and related genera of the family Asteraceae, *Carthamus tinctorius* L., *Centaurea cyanus* L., *C. moschata* [*Amberboa moschata* L.] *Cynara scolymus* L., *Helianthus annuus* L. (FREIDBERG & KUGLER 1989, WHITE & ELSON-HARRIS 1992).

Distribution in Iran: Baluchestan, Khorasan (BECKER 1912), Azerbaijan-e Sharghi, Gorgan, Fars, Esfahan, Ghom (MODARES AWAL 1994, HATAMI et al. 2008, KEYHANIAN 2008), Tehran (MOHAMADZADEH NAMIN et al. 2010c), Ardebil (MOHAMADZADE NAMIN et al. 2010c), Fars (FAZEL et al. 2011), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Azerbaijan-e Gharbi (KARIMPOUR 2011), KOHGILUYE & BUYERAHMAD (SAEIDI & NUR AZURA 2011a,b, SAEIDI et al. 2011b,c,d), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2011a, GHARAJEDAGHI et al. 2012a,b, KHAGHANI NIA et al. 2012, KHAGHANI NIA & GHARAJEDAGHI 2012).

General distribution: Africa (Ethiopia, Kenya, Sudan), Asia (India, Pakistan, Thailand), Atlantic Islands (Madeira), Europe (All Southern countries, plus the United Kingdom) (WHITE & ELSON-HARRIS 1992), Europe, East to Mongolia, South to North, East Africa, Afghanistan, Thailand (NORRBOM et al. 1998).

Genus *Campiglossa* RONDANI, 1870

***Campiglossa producta* (LOEW, 1844)**

Material examined: 2♂♂: Fars, Atabak, 29°46'N, 52°51'E, 01.vii.2013, Malaise trap in alfalfa field.

Host records from Iran: *Picris strigosa* BIEB (Asteraceae) (KARIMPOUR 2011); *Lactuca serriola* L. (Asteraceae) (MOHAMADZADE NAMIN & NOZARI 2011a). *Sonchus arvensis* L. (Asteraceae) (MOHAMADZADEH NAMIN et al. 2010c).

Hosts outside Iran: *Chondrilla juncea* L., *Crepis* spp., *Leontodon* spp., *Hieracium* spp. (Asteraceae) (MERZ 1994).

Distribution in Iran: Azarbaijan-e Gharbi, Azarbaijan-e Sharghi, Fars, Golestan, Khuzestan, Lorestan, Tehran (GILASIAN 2007), Tehran (MOHAMADZADEH NAMIN et al. 2010c), Ardebil (MOHAMADZADE NAMIN et al. 2010a), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Azerbaijan-e Gharbi (KARIMPOUR 2011).

General distribution: Britain, Finland to Mediterranean, Turkey, Central Asia (Norrbon et al. 1998), Europe, Asia Minor, Middle Asia; Near East, Iran, Afghanistan, Iraq (KORNEYEV & DIRLBEK 2000).

Genus *Capitites* FOOTE & FREIDBERG, 1981

***Capitites ramulosa* (LOEW, 1844)**

Material examined: 1♀: Fars, Olom v Tahghighat, 29°59'N, 52°39'E, 10.iv.2013, Malaise in weed habitat. **This is a new record for the fauna of Iran and Fars province.**

Host records from Iran: Unknown.

Hosts outside Iran: The larvae develop in flower heads of *Phagnalon rupestre* (Asteraceae) (FREIDBERG & KUGLER 1989).

General distribution: Afro-tropical region, Near East, North Africa, Europe (FREIDBERG & KUGLER 1989).

Genus *Goniurellia* HENDEL, 1927***Goniurellia lacerata* (BECKER, 1913)**

Material examined: 1♂: Fars, Jahrom, 28°50'N, 53°58'E, 30.v.2013, pan trap in citrus garden. **This is a new record for the fauna of Fars province.**

Hosts outside Iran: Unknown.

Distribution in Iran: Baluchestan, Kerman (BECKER 1912), Bushehr, Kerman (GILASIAN 2007).

General distribution: Egypt, Iran (NORRBOM et al. 1998), United Arab Emirates (MERZ 2008).

Genus *Sphenella* ROBINEAU-DESVOIDY, 1830***Sphenella marginata* (FALLÉN, 1814)**

Material examined: 1♀: Fars, Farough, 29°15'N, 53°25'E, 04.x.2013, Malaise trap in peach garden. **This is a new record for the fauna of Fars province.**

Hosts outside Iran: *Senecio alpinus* (L.), *S. erucifolius* L., *S. jacobaea* L., *S. rupester* W. & K., *S. viscosus* L., *S. vulgaris* L. (Asteraceae) (MERZ 1994).

Distribution in Iran: Ardebil (MOHAMADZADE NAMIN et al. 2010a), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2011a, GHARAJEDAGHI et al. 2012a,b, KHAGHANI NIA & GHARAJEDAGHI 2012).

General distribution: North Europe E to W. Siberia, S to Spain, Egypt, Afghanistan (NORRBOM et al. 1998).

Genus *Tephritis* LATREILLE, 1804***Tephritis divisa* (RONDANI, 1871)**

Material examined: 1♂: Fars, Atabak, 29°46'N, 52°51'E, 16.vii.2013, Malaise trap in alfalfa field. **This is a new record for the fauna of Fars province.**

Hosts outside Iran: *Picris echioides* L. (Asteraceae) (MERZ 1994).

Distribution in Iran: Mazandaran (MOHAMADZADE NAMIN 2011b).

General distribution: Spain, South France, South Switzerland, Italy, Greece (Crete), Israel (NORRBOM et al. 1998), Iran (MOHAMADZADE NAMIN 2011b).

***Tephritis postica* (LOEW, 1844)**

Material examined: 1♂: Fars, Atabak, 29°46'N, 52°51'E, 24.v.2013, swept from flower heads of *Onopordum acanthium* L.

Host records from Iran: *Onopordum acanthium* L., *O. leptolepis* D.C. (Asteraceae) (MOHAMADZADE NAMIN et al. 2010c, KARIMPOUR 2011, MOHAMADZADE NAMIN & NOZARI 2011a).

Hosts outside Iran: *Onopordum cynarocephalum* BOISS. & BLANCHE. *O. acanthium* L. (Asteraceae) (KUTUK & OZGUR 2003, KUTUK 2006).

Distribution in Iran: Esfahan, Hamadan, Kermanshah, Khorasan-e Razavi, Semnan, Tehran, Zanjan, Azerbaijan-e Sharghi (GILASIAN 2007, MOHAMADZADEH NAMIN et al. 2010c, ZARGHANI et al. 2010a, Gharajedaghi et al. 2011c, GHARAJEDAGHI et al. 2012a,b), Ardebil (MOHAMADZADE NAMIN et al. 2010a), Fars (FAZEL et al. 2011), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Azerbaijan-e Gharbi (KARIMPOUR 2011).

General distribution: Europe, Western Asia (FREIDBERG & KUGLER 1989), France, Central Europe, Ukraine, Uzbekistan, South to North Africa, Israel, Iran (NORRBOM et al. 1998).

Genus *Tephritomyia* HENDEL, 1927

***Tephritomyia lauta* (LOEW, 1869)**

Material examined: 13 ♀♀; 21 ♂♂: Fars, Arsanjan, 29°55'N, 53°18'E, 19.iv.2013, Malaise trap in weed habitat; 53 ♀♀; 30 ♂♂: Fars, Marvdasht, 29°52'N, 52°48'E, 19.iv.2013, swept from flower heads of *Echinops* sp. **This is a new record for the fauna of Fars province.**

Hosts outside Iran: *Echinops viscosus* DC. (Asteraceae) (FREIDBERG & KUGLER 1989).

Distribution in Iran: Ardebil (MOHAMADZADE NAMIN et al. 2010a), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2011c, GHARAJEDAGHI et al. 2012a,b).

General distribution: Greece, Israel, Iran, Tunisia, Egypt (NORRBOM et al. 1998).

Genus *Trupanea* SCHRANK, 1975

***Trupanea amonea* (FRAUENFELD, 1857)**

Material examined: 14 ♀♀; 4 ♂♂: Fars, Dashtak, 30°17'N, 52°28'E, 06.iv.2013, Malaise trap in weed habitat.

Host record from Iran: *Lactuca serriola* L. (Asteraceae) (MOHAMADZADE NAMIN & NOZARI 2011a).

Hosts outside Iran: It may be locally a pest species on cultivated *Lactuca* and *Calendula* (Asteraceae) (WHITE & ELSON-HARRIS 1992).

Distribution in Iran: Baluchistan, Kerman (BECKER 1912), Tehran (MOHAMADZADEH NAMIN et al. 2010c), Ardebil (MOHAMADZADE NAMIN et al. 2010a), Kurdistan (MOHAMADZADE NAMIN & NOZARI 2011a), Fars (FAZEL et al. 2011), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2011a, GHARAJEDAGHI et al. 2012a,b, KHAGHANI NIA et al. 2012, KHAGHANI NIA & GHARAJEDAGHI 2012).

General distribution: Widespread, South Palearctic Region, Ethiopia, India, Sri Lanka, Australia (NORRBOM et al. 1998).

***Trupanea stellata* (FUESSLIN, 1775)**

Material examined: 5 ♀♀; 4 ♂♂: Fars, Takht e Jamshid, 29°56'N, 52°53'E, 14.iv.2013, swept from flower heads of unknown weeds.

Host record from Iran: *Senecio vulgaris* L. (Asteraceae) (MOHAMMADZADE NAMIN & NOZARI 2011a).

Hosts outside Iran: *Senecio* spp., *Artemisia judaica* L., *Inula graveolens* L., *I. viscosa* L., *Anthemis* spp., *Aster* sp., *Bidens* sp., *Centaurea* spp., *Crepis* spp., *Inula* sp., *Picris* sp., *Senecio* sp., *Serratula* sp. (Asteraceae) (FREIDBERG & KUGLER 1989, MERZ 1994).

Distribution in Iran: Baluchistan, Kerman (BECKER 1912), Tehran (MOHAMADZADEH NAMIN et al. 2010c), Ardebil (MOHAMADZADE NAMIN et al. 2010a), Kurdistan (MOHAMMADZADE NAMIN & NOZARI 2011a), Fars (FAZEL et al. 2011), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2011a, GHARAJEDAGHI et al. 2012a,b, KHAGHANI NIA et al. 2012, KHAGHANI NIA & GHARAJEDAGHI 2012).

General distribution: British Is., Scandinavia East to Mongolia, South to North Africa, Middle East, Iran, India (NORRBOM et al. 1998), Palearctic, Oriental Regions, United Arab Emirates (MERZ 2008).

Tribe T e r e l l i i n i

Genus *Terellia* ROBINEAU-DESVOIDY, 1830

Terellia gynaeochroma (HERING, 1937)

Material examined: 2♂♂: Fars, Takht e Jamshid, 29°56'N, 52°53'E, 14.iv.2013, swept from flower heads of unknown weeds; 1♂: Fars, Atabak, 29°46'N, 52°51'E, 14.iv.2013, swept from flower heads of *Onopordum acanthium* L.

Host record from Iran: *Onopordum acanthium* L. (Asteraceae) (MOHAMMADZADE NAMIN et al. 2010c, KARIMPOUR 2011, MOHAMMADZADE NAMIN & NOZARI 2011a). *Onopordum heterocanthum* C.A. Mey (Asteraceae) (MOHAMMADZADE NAMIN et al. 2010a, MOHAMMADZADE NAMIN & NOZARI 2011b).

Hosts outside Iran: *Onopordum*, *Cynara* (Asteraceae) (KORNEYEV & DIRLBEK, 2000), *Onopordum anisacanthum* BOISS., *O. illyricum* L., *O. acanthium* L. (Asteraceae) (KUTUK & VAROL 2006).

Distribution in Iran: Ardabil, Fars, Qazvin (GILASIAN 2007, MOHAMADZADE NAMIN et al. 2010a), Azerbaijan-e Gharbi (KARIMPOUR 2011), Azerbaijan-e Sharghi (GHARAJEDAGHI et al. 2012a,b, KHAGHANI NIA et al. 2012, KHAGHANI NIA & GHARAJEDAGHI 2012).

General distribution: Central & South Europe, East to Caucasus, South to Cyprus, Israel, Iran (NORRBOM et al. 1998).

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Zusammenfassung

Vorliegende Arbeit behandelt die Tephritidaen-Fauna der Provinz Fars im Süd-Iran. Im Jahr 2013 gelang der Nachweis von 15 Arten aus 13 Gattungen, zugehörig zu 5 Triben und 2 Unterfamilien. Die Gattung *Schistopterum* BECKER, 1903 und zwei Arten, *S. moebiusi* BECKER, 1903 und *Capitites ramulosa* (LOEW, 1844), konnten das erste Mal für den Iran nachgewiesen werden. Zusätzlich enthalten sind Angaben zu den einzelnen Arten und der/den Wirtspflanze(n) sowie die geographische Verbreitung aller untersuchten Arten.

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